



US patent application No. 10/717,463

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Reply to Notice of Non-Compliant Amendment of January 17, 2006

AMENDMENTS TO THE CLAIMS

This listing of claims will replace all prior versions, and listings, of claims in the application:

Listing of claims

Claim 1 (original): A process for isolating a phytosterol from a pulping soap, comprising the steps of:

- a) treating said pulping soap with a first solvent selected from the group consisting of propan-2-one, methanol and mixtures thereof to remove water from said pulping soap and thereby obtain a liquid phase and a phytosterol-containing semi-solid phase;
- b) separating the liquid phase and the semi-solid phase from one another;
- c) extracting said phytosterol from said semi-solid phase with a second solvent selected from the group consisting of C₃-C₆ ketones, C₁-C₆ alkanols and mixtures thereof; and
- d) recovering said phytosterol.

Claim 2 (original): The process of claim 1, wherein said first solvent is propan-2-one.

Claim 3 (original): The process of claim 1, wherein said first solvent is methanol.

Claim 4 (currently amended): The process of claim 1, wherein in step (a), water contained in the pulping soap is transferred into the liquid phase so that the semi-solid phase obtained in step (b) ~~is substantially free of water~~ has a residual water content of less than about 10 weight %.

Claim 5 (original): The process of claim 1, wherein the liquid phase obtained in step (b) is treated to separate said first solvent and said water from one another and wherein the first solvent thereby separated is recycled to step (a).

Claim 6 (original): The process of claim 1, wherein said second solvent is propan-2-one.

Claim 7 (original): The process of claim 1, wherein step (c) is carried out at a temperature ranging from 20 to 55 °C.

Claim 8 (original): The process of claim 1, wherein in step (d) said second solvent is recovered and recycled to step (c).

Claim 9 (currently amended): The process of claim 1, further including the step of recovering said a solid material from said semi-solid phase.

Claim 10 (original): The process of claim 9, wherein said solid material comprises a mixture of salts of fatty acids and salts of resinic acids.

Claim 11 (original): The process of claim 1, further including the step of purifying the phytosterol recovered in step (d).

Claim 12 (original): The process of claim 1, wherein the recovered phytosterol comprises a mixture of β -sitosterol, campesterol and stigmasterol.

Claim 13 (original): The process of claim 12, wherein said mixture comprises from 50 to 80% by weight of β -sitosterol, from 10 to 30% by weight of campesterol and from 5 to 20% by weight of stigmasterol, based on the total weight of the mixture.

Claim 14 (original): The process of claim 13, wherein said mixture comprises about 69% by weight of β -sitosterol, 19% by weight of campesterol and about 12% by weight of stigmasterol, based on the total weight of the mixture.

Claim 15 (currently amended): A process for isolating a phytosterol from a pulping soap, comprising the steps of:

- a) treating said pulping soap with a first solvent selected from the group consisting of propan-2-one, methanol and mixture thereof to remove water from said pulping soap and to obtain a liquid phase and a phytosterol-containing semi-solid phase;
- b) separating the liquid phase and the semi-solid phase from one another;
- c) treating said semi-solid material phase with a second solvent consisting of propan-2-one to obtain a solution of said phytosterol in said second solvent, and a solid material;
- d) separating said solution and said solid material from one another;
- e) recovering the phytosterol from said solution; and

f) recovering said solid material.

Claim 16 (currently amended): The process of claim 15, wherein in step (a), water contained in the pulping soap is transferred into the liquid phase so that the semi-solid phase obtained in step (b) ~~is substantially free of water~~ has a residual water content of less than about 10 weight %.

Claim 17 (original): The process of claim 15, wherein the liquid phase obtained in step (b) is treated to separate said first solvent and said water from one another and wherein the first solvent thereby separated is recycled to step (a).

Claim 18 (original): The process of claim 15, wherein step (d) is carried out by filtration or decantation.

Claim 19 (original): The process of claim 15, wherein step (e) is carried out by evaporating said second solvent.

Claim 20 (original): The process of claim 19, wherein said second solvent is condensed and recycled to step (c).

Claim 21 (original): The process of claim 15, wherein step (f) is performed prior to step (e) or simultaneously therewith.

Claim 22 (original): The process of claim 15, further including the step of purifying the phytosterol recovered in step (e).

Claim 23 (original): The process of claim 15, wherein the recovered phytosterol comprises a mixture of β -sitosterol, campesterol and stigmasterol.

Claim 24 (original): The process of claim 23, wherein said mixture comprises from 50 to 80% by weight of β -sitosterol, from 10 to 30% by weight of campesterol and from 5 to 20% by weight of stigmasterol, based on the total weight of the mixture.

Claim 25 (original): The process of claim 24, wherein said mixture comprises about 69% by weight of β -sitosterol, 19% by weight of campesterol and about 12% by weight of stigmasterol, based on the total weight of the mixture.

Claim 26 (original): The process of claim 15, wherein said solid material comprises a mixture of salts of fatty acids and salts of resinic acids.

Claim 27 (original): The process of claim 26, wherein said salts comprise metal salts in which the metal is selected from the group consisting of Al, Ca, Fe, K, Mg, Na and mixtures thereof.

Claim 28 (original): The process of claim 27, wherein said salts are sodium salts.

Claim 29 (withdrawn): A process for isolating a mixture of salts of fatty acids and salts of resinic acids from a pulping soap, comprising the steps of:

a) treating said pulping soap with a first solvent selected from the group consisting of propan-2-one, methanol and mixtures thereof to remove water

from said pulping soap and thereby obtain a first liquid phase and semi-solid phase;

b) separating the first liquid phase and the semi-solid phase from one another;

c) treating said semi-solid material with a second solvent selected from the group consisting of C₃-C₆ ketones, C₁-C₆ alkanols and mixtures thereof to obtain a second liquid phase and a solid material comprising said mixture of salts of fatty acids and salts of resinic acids;

d) separating said second liquid phase and said solid material from one another; and

e) recovering said solid material.

Claim 30 (withdrawn): The process of claim 29, wherein in step (a), water contained in the pulping soap is transferred into the liquid phase so that the semi-solid phase obtained in step (b) is substantially free of water.

Claim 31 (withdrawn): The process of claim 29, wherein the liquid phase obtained in step (b) is treated to separate said first solvent and said water from one another and wherein the first solvent thereby separated is recycled to step (a).

Claim 32 (withdrawn): The process of claim 29, wherein said second solvent is propan-2-one.

Claim 33 (withdrawn): The process of claim 29, further comprising the step of recovering the second liquid phase, said second liquid phase comprising said second solvent and a phytosterol.

Claim 34 (withdrawn): The process of claim 33, wherein said phytosterol is isolated by evaporating said second solvent.

Claim 35 (withdrawn): The process of claim 29, wherein said second solvent is condensed and recycled to step (c).

Claim 36 (withdrawn): The process of claim 29, further including the step of acidifying acid salts to obtain a mixture of the corresponding fatty acids and resinic acids.

Claim 37 (withdrawn): The process of claim 29, wherein said solid material comprises from 25 to 75% by weight of sodium salts of fatty acids, based on the total weight of the mixture.

Claim 38 (withdrawn): The process of claim 29, wherein said solid material comprises from 25 to 75% by weight of sodium salts of resinic acids, based on the total weight of the mixture.

Claim 39 (withdrawn): The process of claim 29, wherein said salts comprise metal salts in which the metal is selected from the group consisting of Al, Ca, Fe, K, Mg, Na and mixtures thereof.

Claim 40 (withdrawn): The process of claim 39, wherein said salts are sodium salts.